

## Q-Switched Ruby Laser in the Treatment of Labial Melanotic Macules

Girish Gupta, MRCP,<sup>1\*</sup> Iain R. MacKay, FRCS Plastics,<sup>2</sup> and  
Rona M. MacKie, FRCP<sup>1</sup>

<sup>1</sup>University Department of Dermatology, Western Infirmary, Dumbarton Road,  
Glasgow G11 6NT, United Kingdom

<sup>2</sup>Department of Plastic Surgery, Canniesburn Hospital,  
Glasgow G61 1QL, United Kingdom

**Background and Objective:** The term, labial melanotic macule, refers to a benign entity. The Q-switched ruby laser (QSRL) has been used to treat such lesions but the numbers are small with relatively short follow-up.

**Study Design/Materials and Methods:** Eight patients were treated with single pulses of the QSRL (694 nm, 20 nsec pulse duration, and 5 mm spot size) at 6.5 J/cm<sup>2</sup>. Patients were followed-up for a maximum of 24 months to assess for recurrence.

**Results:** Five patients cleared with a single pulse of the QSRL, while three required a second treatment session. There were no side-effects reported. At follow-up, there was no recurrence of pigment.

**Conclusions:** Treatment of labial melanotic macules with the QSRL produces excellent cosmetic results. No new pigment was detected at follow-up. *Lasers Surg. Med.* 25:219–222, 1999.

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**Key words:** follow-up; labial pigmentation; laser treatment

### INTRODUCTION

Labial melanotic macules are pigmented macules most commonly found on the vermilion border in the central third of the lower lip of adults [1]. Significantly, more females than males seek treatment for this condition [1]. The macules are benign and the pathological picture is that of a simple ephelide or freckle with a linear increase in pigment in the basal layer but no proliferation of melanocytes. Since the Q-switched ruby laser (QSRL) selectively destroys pigment-laden cells [2,3], it has been used to treat café-au-lait macules [4,5], lentigines [4,5], and blue-black tattoos [6,7] with good cosmetic results. The efficacy of the QSRL has also been reported in the treatment of labial lentigines [8–11]. However, in these studies, the patient numbers were small and follow-up short. As some authors have reported, recurrence of pigment in other pigmented lesions at follow-up, we assessed the role of the QSRL in eight patients with labial melanotic macules to determine whether any of the treated lesions had recurred during a mean follow-up of 19.5 months.

### MATERIALS AND METHODS

Eight patients (seven female and one male) requested removal of labial melanotic macules for cosmetic reasons. The median age was 46 years (41–65). After obtaining ethical committee approval and patient consent, all lesions were photographed and treated with the QSRL (Dermalase QSRL, Lumonics, Rugby, UK). Treatment was given with single pulses (694 nm and 20 nsec pulse duration) at 6.5 J/cm<sup>2</sup> with a spot size of 5 mm. Patients were reviewed at intervals of 2 months over a 6-month period and then annually. Further treatment at the same dose and duration was given to any remaining lesion. Each lesion was therefore treated at most three times. Topical or intra-lesional anaesthesia was not routinely used unless asked for by the patient.

\*Correspondence to: Dr. Girish Gupta, Department of Dermatology, Western Infirmary, Dumbarton Road, Glasgow G11 6NT, United Kingdom.

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**TABLE 1. Characteristics of Patients With Labial Melanotic Macules Treated With Q-Switched Ruby Laser**

| Patient | Sex    | Age (years) | Number of lesions | Maximum diameter (mm) | Duration of lesion (months) | Duration of follow-up (months) |
|---------|--------|-------------|-------------------|-----------------------|-----------------------------|--------------------------------|
| 1       | Female | 41          | 1                 | 3                     | 24                          | 24                             |
| 2       | Female | 43          | 1                 | 4                     | 120                         | 24                             |
| 3       | Female | 43          | 2                 | 3 and 5 each          | 18                          | 12                             |
| 4       | Female | 44          | 1                 | 7                     | 120                         | 24                             |
| 5       | Female | 48          | 1                 | 4                     | 360                         | 24                             |
| 6       | Female | 59          | 1                 | 4                     | 24                          | 12                             |
| 7       | Male   | 61          | 2                 | 1 and 3 each          | 12                          | 24                             |
| 8       | Female | 65          | 1                 | 3                     | 20                          | 12                             |



Fig. 1. Labial melanotic macule in the central third of the lower lip.

At the end of the study, patients were re-photographed to assess clearance of the pigment and asked to complete a questionnaire indicating their satisfaction and any side-effects experienced with the treatment. Patients were followed up for a mean duration of 19.5 months and then reassessed to determine if any of the lesions had recurred.

## RESULTS

Six patients presented with one labial melanotic macule each and two patients had two such lesions. All lesions were on the lower lip with seven localised to the central third and three to the lateral third portion. The median diameter of the labial melanotic macules was 3.5 mm (1–7 mm). The median duration of the lesions was 24 months (12–360 months), with no reports of any change in the lesions (Table 1).

Five patients cleared with a single pulse of the QSRL, while three required a second treatment session. Treatment with the QSRL produced excellent cosmetic results without any scarring (Figs. 1, 2). None of the patients required or requested topical or intra-lesional anaesthesia.

Results from the questionnaire showed that all eight patients were satisfied with the treatment they received and noticed a complete clearance in the pigmentation. At a mean follow-up of 19.5 months and a maximum follow-up of 24 months, none of the lesions had developed any new pigment. There were no side-effects reported.

## DISCUSSION

Patients with labial melanotic macules should be reassured. Routinely hospital surveillance is not required. However, some patients request removal of their lesions for cosmetic



Fig. 2. Complete clearance of the pigment following treatment with the Q-switched ruby laser.

TABLE 2. Published Reports of Labial Lentigines Treated With the Ruby Laser

| Authors                    | Number of cases | Diagnosis               | Type of laser  | Maximum follow-up | Mean follow-up | Results |
|----------------------------|-----------------|-------------------------|--|-------------------|----------------|---------|
| Hanada et al. [8]          | 6               | Mucosal melanosis       | NMRL <sup>a</sup> , 694 nm, 1–2 msec, 16–18 J/cm <sup>2</sup> , spot size not reported | 3 months          | 3 months       | Cleared |
| Ashinoff et al. [9]        | 3               | Labial lentigos         | QSRL <sup>b</sup> , 694 nm, 40 nsec, 10 J/cm <sup>2</sup> , 5 mm spot                  | 18 months         | 13 months      | Cleared |
| Chang et al. [10]          | 1               | Peutz-Jeghers           | QSRL, 694 nm, 20 nsec, 10 J/cm <sup>2</sup> , 4 mm spot                                | 12 months         | —              | Cleared |
| DePadova-Elder et al. [11] | 1               | Peutz-Jeghers           | QSRL, 694 nm, 20 nsec, 4.5 J/cm <sup>2</sup> , 6.5 mm spot                             | 8 months          | —              | Cleared |
| Current study              | 8               | Labial melanotic macule | QSRL, 694 nm, 20 nsec, 6.5 J/cm <sup>2</sup> , 5 mm spot                               | 24 months         | 19.5 months    | Cleared |

<sup>a</sup>NMRL, normal mode ruby laser.

<sup>b</sup>QSRL, Q-switched ruby laser.

reasons. Surgical excision inevitably leads to scarring. Cryotherapy and infra-red coagulation have been used with good cosmetic results [1].

The QSRL, set at 694 nm, produces a wavelength that is well absorbed by melanin. The pulse duration produced by the laser approximates the thermal relaxation time for melanosomes [2,3]. The energy from the laser therefore causes selective destruction of the pigment-laden cells [2,3]. Owing to these properties, the QSRL has been used to treat a variety of pigmented lesions with variable results. The QSRL has been effective in the treatment of lentigines, café-au-lait macules, naevus spilus, Becker's naevi, ephe- lides [4,10], and blue-black tattoos [6,7]. There are

reports of lightening or clearing of pigment in naevus of Ota [12,13]. Despite its successes, some authors have found partial recurrence in the pigment of café-au-lait macules [14], naevus spilus [5], and congenital naevi [15] at follow-up. Similar results have been reported with other Q-switched lasers [16].

There are four reports in the literature of the QSRL being used specifically to treat labial lentigines (Table 2). All reports show clearance of the pigment with no recurrence in the treated lesions. However, follow-up was relatively short in all cases. Like our study, the 20 nsec pulse duration was used in two of these studies [10,11]. The 20 nsec pulse duration is shorter than the thermal relaxation time of melanosomes and so may maxi-

mise selective melanosomal damage with a reduced risk of scarring.

Our study confirms previous reports of the role of QSRL in clearing pigment of labial melanotic macules. The advantages of the treatment are that the lesions are cleared without side-effects or scarring. The technique is also "operator-friendly," since each lesion can be treated within a fraction of a second. More importantly, there was no recurrence in the pigment of treated lesions at a mean and maximum follow-up of 19.5 months and 24 months, respectively.

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